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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,460	07/18/2001	Lynn B. Lunsford	08191-014002	1198

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MINNEAPOLIS, MN 55440-1022

EXAMINER
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MARVICH, MARIA

ART UNIT	PAPER NUMBER
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1633

NOTIFICATION DATE	DELIVERY MODE
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12/01/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

<b>Office Action Summary</b>	<b>Application No.</b> 09/909,460	<b>Applicant(s)</b> LUNSFORD ET AL.	
	<b>Examiner</b> MARIA B. MARVICH	<b>Art Unit</b> 1633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4,52,63-69 and 85-113 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 52, 63-69 and 85-113 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/12/08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

The previous office action mailed 11/6/08 has been vacated and replaced in its entirety with the following action.

Claims 1, 4, 52, 63-69 and 85-113 are pending in the application. This office action is in response to an amendment filed 7/7/08.

In this response applicants have argued that the cited references do not constitute prior art as the instant application claims priority to PCT/US98/01499, filed January 22, 1998. It is noted that the chain of priority is 09/909460, filed 7/18/01 which claims priority to 09/321,346 filed 5/27/1999 which is a continuation in part of 09/266,463, filed 3/11/1999, which is a continuation in part of 09/003,253 filed 1/6/98 which claims priority to 60/035,983 filed 1/22/97 and PCT/US98/01499 filed 1/22/98. In the office action mailed 11/22/05, it was set forth that support for the limitation that a microparticle comprises in addition to a polymeric matrix and a nucleic acid, a lipid is not found in the priority documents 09/003,253 filed 1/6/1998, 60/035,983, filed 1/22/1997 or PCT/US98/01499 filed 1/22/1998. These applications are drawn to microparticles comprising polymeric matrices and nucleic acids. While these applications consider use of lipids as stabilizers present in excipients or formulations, the applications do not contemplate a microparticle comprising a lipid. This limitation has been added to prior applications 09/266,463, filed 3/11/1999. Therefore, a priority date of 3/11/1999 will be attributed to the instant claims. In response, applicants did not provide any evidence that an earlier priority date was supported and hence the art rejections set forth below are based upon a priority date of the claims of 3/11/1999.

It is also noted that applicants have amended claims 1 and 52 to recite that the polymeric matrix "consists essentially of one or more synthetic polymers having a solubility in water of less than about 1 mg/l". According to the MPEP (2105), "A consisting essentially of" claim occupies a middle ground between closed claims that are written in a consisting of" format and fully open claims that are drafted in a comprising' format." "For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355". In this case, claims 66 and 96 dependent from claims 1 and 52 recite, The polymeric matrix comprises a synthetic, biodegradable copolymer" obviating the option that "consisting essentially of" can be construed as "closed".

#### ***Claim Objections***

Claims 85-90 are objected to because of the following informalities: Claim 85 requires the word --of-- prior to the phrase "at least 7 amino acids". As well the phrase "and comprising a sequence identical" does not indicate that it is the at least 7 amino acids that are identical. Therefore, it would be remedial to recite --that are identical--.

Claim 85 is drawn to microparticles comprising a coding sequence wherein the coding sequence encodes an expression product of at least 7 amino acids in lengths. Each of claim 86 further limits claim 85 by recitation "wherein the expression product comprises a fragment of a protein selected". It appears that the fragment in claim 86 and the 7 amino acid sequence are the

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same which for clarity should be amended to recite --wherein the protein is selected-- in claim

86. Otherwise, it appears that there are two fragments in claim 86.

Similarly claims 87, 89 and 90 recite, "wherein the expression product comprises an amino acid sequence identical to a sequence", which also appears to be further modifying the expression product as opposed to be introducing a second fragment into the expression product. As such, it would be clearer to recite in claim 87, --wherein the expression product is selected from the group consisting of--, in claim 89 to --wherein the expression product is from an antigenic portion of a tumor antigen-- and in claim 90 to "wherein the infectious agent is selected from the group consisting of--.

Claim 88 requires the word "further" prior to "comprises a trafficking sequence" for clarity.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 52, 63-69 and 85-113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedley et al (US Patent 5,783,567; see entire document) in view of Lambert et al (Biochimie, 1998, Vol 80, pages 969-976; see entire document) or Balland et al (NATO ASI

Series, 1996, Vol 290, pages 131-142; see entire document) in view of Knepp et al (US 6,264,990; see entire document). **This is a new rejection necessitated by applicants' amendment.**

The instant claims are drawn to a micro particle less than 20 microns in diameter comprising a polymeric matrix, a lipid and a nucleic acid wherein the polymeric matrix has a solubility in water of at less than 1 mg/l and wherein at least 50% if the nucleic acids are supercoiled.

Deleted: acid wherein

Hedley et al teach a microparticle as well as preparations of microparticles wherein the microparticles comprise a polymeric matrix and a nucleic acid expression vector. The polymeric matrix includes one or more synthetic polymers having a solubility of less than 1 mg/l that can be biodegradable. In certain cases, the polymeric matrix can be made of a single synthetic, biodegradable copolymer, e.g., poly-lactic-co-glycolic acid (PLGA). The ratio of lactic acid to glycolic acid in the copolymer can be within the range of about 1:2 to about 4:1 by weight, preferably within the range of about 1:1 to about 2:1 by weight, and most preferably about 65:35 by weight. In some cases, the polymeric matrix also includes a targeting molecule such as a ligand, receptor, or antibody, to increase the specificity of the microparticle for a given cell type or tissue type. The microparticles are at least 11 microns and the nucleic acid at least 80% supercoiled (see e.g. col 1-2). The nucleic acid include an expression control sequence operatively linked to an expression predict encoding at least 7 amino acids having a sequence essentially identical to the sequence of either a fragment of a naturally-occurring mammalian protein or a fragment of a naturally-occurring protein from an agent which infects or otherwise

harms a mammal; or a peptide having a length and sequence which permit it to bind to an MHC class I or II molecule (col 2, line 21-36).

Lambert et al teach a microparticle less than 20 microns in diameter (see e.g. page 972, col 2, paragraph 2) comprising a polymeric matrix, a lipid and a nucleic acid (see e.g. page 970, col 1, paragraph 4- col 2, paragraph 3) and preparations of these microparticles (see e.g. table 1).

Balland et al teach a microparticle less than 20 microns in diameter (see e.g. page 132, paragraph 4) comprising a polymeric matrix, a lipid and a nucleic acid (see e.g. page 132, paragraph 4- 5) and preparations of these microparticles (see e.g. page 133, paragraph 4).

As an initial point, KSR forecloses the argument that a specific teaching, suggestion or motivation is required to support a finding of obviousness. See the recent Board decision *Exparte Smith --USPD2d--*, slip op. at 20, (BD. Pat. App. & Interfer. June 25, 2007). In this case each of Headley et al, Lambert et al and Balland et al teach design of microparticles that are less than 20 microns, as well as 11 microns. Each teaches that complexes of polymeric matrices and nucleic acids can be used to delivery the nucleic acids to cells. Headley et al teach that the polymeric matrix is preferably one that has a solubility of less than 1mg/l as in the recited claims. Specifically, Headley et al teach use of PLGA. Balland and Lambert et al do not explicitly teach that the polymers have a solubility of less than 1mg/L however, these references do teach that it was known in the art to include lipids in the preparation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the lipid which functions as an ion pairing agent with the phosphate groups of the nucleic acids (see e.g. Lambert et al page 970, col 2 and figure 1). Based upon the teachings of the cited references, the high skill of one

of ordinary skill in the art, and absent evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

Claims 1, 4, 52, 63-69, 85, 86 and 88-113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paphadjopolous et al (US 6,210,707; see entire document) in view of Cleek et al (J Biomed. Materials Res, 1997, pages 525-530; see entire document) as evidenced by Manoharan et al (2005/0153337; see entire document). **This is a new rejection necessitated by applicants' amendment.**

Paphadjopolous et al teach a lipidic microparticle comprising lipids and nucleic acids (see e.g. abstract) and polymeric matrices (see e.g. col 3, line 50-67). The invention is designed to provide lipid: nucleic acid complexes that have increased shelf life, for transfection of mammalian (see e.g. col 18, line 50-53). The lipidic-microparticles can be made with amphiphilic cationic lipids complexed with nucleic acids and polymer (see e.g. col 7, line 16-29). The microparticles can be part of a preparation and are each less than 11 microns (see e.g. col 8, line 34-41 and col 18, line 29-47) as recited in claims 1, 7, 52 and 64. The nucleic acid can be part of an expression cassette that is disclosed as being expression vectors or plasmids, which are circular, expressing polypeptides (see e.g. col 8, line 21-26, col 11, line 41-51). The expression cassettes encode polypeptides such as globin, which comprise at least 7 amino acids identical to at least a fragment of a naturally occurring mammalian protein. The microparticles further comprise a targeting moiety (see e.g. abstract). The targeting moiety can be attached to the microparticle during production or can be expressed by the nucleic acid of the microparticle. Paphadjopolous specifically describes peptides that bind MHC molecules. The instant



specification describes proteinaceous antigenic determinants as containing an epitope, which limitation is met by the use of ligands on the microparticle. Thus a microparticle with such a targeting moiety and a nucleic acid encoding an antigenic polypeptide such as hGH (see e.g. col 19, line 32-37). Furthermore, it is contemplated that the microparticle encodes a trafficking signal (see e.g. col 12, line 4-12).

Paphadjopolous does not teach that the polymeric matrix is PLGA wherein the ratio of lactic acid to glycolic acid is in a range of 1:2 to about 4:1 or about 65:35 by weight. Applicants' disclosure appears to suggest that PLGA is a polymer that meets the claims requirements of a synthetic polymer with a solubility if less than 1 mg/l in water.

Cleek et al teach use of microparticles for inhibition of smooth muscle cell growth. The microparticles are comprised of nucleic acid and PLGA, one of the few synthetic biodegradable polymers approved for human clinical use (see e.g. page 525, col 2, paragraph 2). PLGA degradation *in vivo* occurs by random non-enzymatic hydrolysis of the polyester bonds along the polymeric backbone at a rate dependent on the copolymer ratio. As they are hydrolyzed to lactic acid and glycolic acid, they are processed normally by the metabolic pathway and eliminated as carbon dioxide (see e.g. page 525, col 2, paragraph 2). The biodegradable PLGA particles were formed in a 1:1 ratio which is in the range of 1:2 to 4:1 and is about 65:35 ratio given that the term "about" is a relative term for which the specification provides no definition. The PLGA served as effective delivery agents (see e.g. page 529, col 2, paragraph 4). While Cleek et al do not teach that the ratio of lactic acid to glycolic acid is "by weight", classically synthesis of PLGA from lactic acid and glycolic acid involves a combination of the monomers "by weight" as evidenced by Manoharan et al (see e.g. paragraph 0873).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the PLGA particles as taught by Cleek et al in the lipid microparticles taught by Paphadjopolous et al because Cleek et al teach that it is within the ordinary skill in the art to use PLGA to deliver nucleic acids to cells and because Paphadjopolous et al teach that it is within the ordinary skill of the art to complex synthetic polymers, i.e. PLGA, to nucleic acid for stable delivery to cells. One would have been motivated to do so in order to receive the expected benefit that the microparticles comprised of PLGA are among the few synthetic biodegradable polymers approved for human clinical use because they are hydrolyzed to lactic acid and glycolic acid, they are processed normally by the metabolic pathway and eliminated as carbon dioxide and they serve as effective delivery agents (see Cleek et al, page 525, col 2, paragraph 2 and page 529, col 2, paragraph 4). Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA B. MARVICH whose telephone number is (571)272-0774. The examiner can normally be reached on M-F (7:00-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Woitach, PhD can be reached on (571)-272-0739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Maria B Marvich, PhD  
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